THE AMERICAN
JOURNAL OF PHARMACY

APRIL, 1895.

EDUCATIONAL DEVELOPMENT IN THE PHILADELPHIA COLLEGE OF PHARMACY.

By Joseph P. Remington.

Pharmacy must advance; with the extraordinary growth in the general educational field, with the striking progress which has characterized the methods of imparting pharmaceutical knowledge in the last decade, and with the absolute necessity of higher and more thorough education of those who enter the ranks, it must be apparent to all that the college which fails to come up to its full measure of the demands made upon it by the ever-widening and rapidly-growing sphere of action, must fall behind; on the other hand, the institution which pushes recklessly forward so far in advance that it cannot carry with it the main body, will soon find itself lost in the clouds and its usefulness greatly impaired, if not irretrievably ruined. Without a progressive element in a college, destruction is certain; without wise foresight and accurate judgment with the restraints imposed by the conditions of its *clientèle*, serious damage is equally certain.

The success of the Philadelphia College of Pharmacy must be attributed in the past to the wisdom of those who have, during the last seventy-five years, guided its destinies. In its early history, in the day of small things, a total class of twenty students was regarded as a great encouragement; when, in the course of time, its income exceeded its expenses; when, more than this, the college proved to its faithful sponsors that it was fulfiling its mission, and when, finally, it became the recognized centre of pharmaceutical

education in America, there arose indications which seemed to show that some of its friends believed that it had reached the acme of its development and influence. But fortunately in this crisis, the majority of those in control clearly grasped the possibilities of the future, realized that there could be no such thing as resting upon the record of the past, but that more labor and greater achievements must be the order of the day, and a backward step was not to be thought of. If this brief review of the past is correctly portrayed, it must be apparent to all that the same conditions prevail now, with the exception that they are at present greatly magnified.

The colleges of pharmacy throughout the United States were founded and have been successfully developed with mainly one object in view, *i. e.*, the fitting of the younger members of the profession for their duties as practical pharmacists, and this must always continue to be the first consideration; but the *standard* of the qualifications of the practical pharmacist will probably always remain to be a subject which admits of diversity of opinion. There are those who hold that the graduate should be an accomplished chemist, an expert botanist, well grounded in mathematics and the languages, and that too much education is beyond the reach of possibility; on the other side, there are those who maintain that such accomplishments unfit the graduate for properly performing his routine of duties—indeed, some going so far as to say that one so highly educated is placed upon a plane far beyond the needs of his position, and is, in fact, made dissatisfied with his lot as a practical pharmacist, and thus such knowledge literally *educates a man out of the business*, such a scholar is useless behind the dispensing counter.

Between these extreme views lies the truth. The education which, ten years ago, would have been considered ample to fit the pharmacist perfectly for his daily work is totally inadequate for the demands of to-day; for, as that most pungent writer of his time, Carlyle, puts it: "The goal of yesterday is but the starting-point of to-morrow." One has but to consider the enormous additions to our materia medica, the flood of synthetic remedies which must be intelligently dispensed, and the practice of the modern, but much abused, elegant pharmacy.

It is easy to fix a standard, and a college catalogue may teem with requirements which, upon paper, seem very alluring to the

advocate of the highest culture; but even if the ambitious aspirant has succeeded in reaching such a dizzy height, the question may well be asked: "Will the possessor of such rare accomplishments ever condescend to accept service in a pharmacy?" In the present condition of the drug business, it must be admitted that there are many other fields of activity which will promise a far better pecuniary return for such a gifted individual, but it must be acknowledged that too little education is far worse than too much. The "rule-of-thumb" druggist who sneers at the college-bred man, and says he can "learn" his boys more in a month than the college can in a year, has his own standard, and it must be a cause of rejoicing for all well-wishers of pharmacy that this man's power for evil is dying just in proportion as the cut-rate evil is progressing. His standard is the mercantile one, and what is he in the drug business for, if it is not solely to sell drugs?

But, leaving this unpleasant individual, let us turn to the means of training outside of the colleges—*the education of the shop*. There are yet thousands of conscientious preceptors who do not consider the assistants in their employ as mere money-getting machines for them, but view them as fellow-creatures, who will soon be called upon to assume the same responsibilities that they themselves are grappling with, who realize that the profession, of which they themselves are honored members, must advance, and that the assistant of to-day must perforce start, theoretically, at least, where the preceptor left off; and that, while in his time, three hours a week at college, with such stolen opportunities from daily routine of shop duties as could be snatched, saw him through college, that "*tempora mutantur, et nos mutamur in illis;*" and it must be remembered that all of our colleges of pharmacy owe to these men a debt which can never be adequately discharged.

It is unfortunate that, at the present time, an effort is being made by some pharmaceutical writers to ignore the value of shop experience, and to insist that the college degree should be conferred before any such experience is acquired. The principal reason upon which this action is based is that the college has no adequate means of judging of the value of this shop experience, and that many students present certificates, which attest to the requisite number of years in the drug business, but which cannot afford any criterion of the preceptor's fitness to give valuable instruction in pharmacy.

While these facts are in a measure true, and there does not seem to be in sight at present any better way than to compel each candidate for the degree to present a duly witnessed and attested certificate of time served, it must be plain that the practical examinations which the college compels the candidate to pass, can be made to measurably reflect the teachings of the preceptor; and it would seem to be illogical and unwise to graduate students and declare them to be fitted to fulfil their duties as practical pharmacists when they have never had a day's experience in a pharmacy.

Shall the work of the good preceptor count for nothing, because of the incompetence of some? Can a man serve four years in a drug store and learn absolutely nothing? And is it possible for one who has never served a day behind the counter, and yet passed a successful examination, to be expected to equal in efficiency one who has served four years and, in addition, had his college education and passed his examination besides? Has the time come for the colleges to throw away this immense advantage which the pharmaceutical student possesses over all other professional students, of actually practising pharmacy, either before he comes to college or after he has entered it? Is not the diploma of a college, which requires this practical experience before graduation, far more valuable in securing for its possessor a remunerative position, than one which grants its diploma to those who never had a day's actual experience? If it has been the misfortune of a student to have served his time with a careless or incompetent preceptor, it should be the duty of the college to repair the loss as far as possible, and every well-equipped college has in its laboratories the means of at least measurably overcoming such a misfortune; but for the college to ignore the value of actual practice in the shop is to throw away an advantage of the first importance. *The work of the preceptor and the college labors of the students should go hand in hand*, and what better way can be devised of keeping the college work in touch with the daily duties of the shop, than the conferences which should be held continually between master and assistant? The preceptor gains greatly; the new points which have been developed since he sat on the benches at college, are discussed and possibly illustrated and amplified to the edification of both, whilst the effect upon the student, upon finding a willing helper and a sympathetic adviser in his daily work, is of incalculable benefit. Surely the best

interests of pharmaceutical education lie in the direction of building up these relations between the preceptor and the assistant, and every effort should be made on the part of the college to foster the interest and influence of such a preceptor. Because some preceptors neglect their privilege and duties, does this constitute sufficient grounds for the college to ignore the work of all? When the point has been reached (and it is sincerely hoped that such a misfortune will never occur), when an able preceptor's work is counted as nothing, or worse than useless, then may we look for the decadence of American pharmacy.

But what shall be said of the druggist who never gives his assistant the slightest training; whose business is limited strictly to merchandising; who gives nothing, yet takes all; whose object is to pay his assistant the lowest salary and exact the utmost amount of labor possible? A moment's time spent by the assistant in examining a drug, testing a chemical or making a preparation, is regarded as a serious fault; kept on the move all day long, deprived of sufficient time to even digest his food properly, and then compelled to rush off to his lectures with his mind and body in a condition of exhaustion, he is surely an object to excite commiseration and arouse indignation. The trifling pecuniary consideration which drug clerks usually receive is always admitted to be offset by the much more important factor of the personal training of the preceptor, and when this part of the contract is shown to be valueless, is it any wonder that the assistant turns to the college and demands that it shall supply the knowledge which is lacking? If the preceptor is unable to properly train his assistant, through lack of knowledge or press of business, he should be more than willing to furnish him with the opportunity to qualify himself elsewhere.

Philadelphia has long been noted for the large number of her well-educated pharmacists. It was here that the first educational institution for teaching pharmacy was established; necessarily, the influence of this school was at first local. Gradually, but surely, the desire for education grew; the little knot of enthusiastic devotees increased. The graduates of the college soon became proprietors of drug stores; these, realizing the great benefits that they had derived from their college education, with a true spirit that they were engaged in a liberal profession, were glad to offer to their assistants the privileges that they themselves had enjoyed, and in

this way the scope of its usefulness was extended. In the course of time the work of the college attracted the attention of the lovers of progress outside of the city and the State, and before many years it became apparent to all, that provision must be made for the needs of students who were eager to avail themselves of its courses of instruction.

Many of those who came had already served the necessary four years in the drug business, and necessarily desired to employ their whole time, during their sojourn in the city, in their college work. To accommodate these, laboratories were established, largely through the efforts of the Alumni Association, and this work was successful from the beginning. Students who were employed in city stores, realizing the advantages that the laboratories afforded, applied for admission, and these soon became taxed to their utmost capacities.

Up to this time such instruction was optional, but the Board of Trustees, being thoroughly convinced of the value of laboratory work, decided that all candidates for the degree should possess such knowledge. This did not necessarily compel students to attend the laboratories, but as a matter of fact the great majority knew that they could obtain this knowledge far more thoroughly at the college than elsewhere. As the methods of teaching gradually developed and improved, it soon became apparent that the student could obtain far more valuable instruction in certain branches by making preparations and conducting experiments himself, than by seeing such performed by the professors on the lecture table. The enlargement of the laboratories necessarily followed, until, at the present time, there are three in successful operation, the last one to be established being devoted to the practical study of pharmacognosy and microscopy.

The college has undoubtedly reached such a period in its development that it must be recognized that *more time* must be required of the student if he wishes to thoroughly grasp and assimilate the vastly-augmented accumulations of facts which modern pharmacy demands. It might be supposed, from a superficial view of the situation, that more intense application on the part of the student during two years of college life would meet the requirements, but the experience of our universities, particularly those devoted to the study of medicine, during the last decade has demonstrated beyond

question that nothing short of an extension of the courses will answer the imperative demands of the hour; for the student, engaged in a drug store while attending college, there can be no other alternative. Our medical schools, that formerly regarded courses of lectures extending over two years sufficient, now require a four years' course, and pharmacy owes it to herself to keep pace with medicine. The Board of Trustees of the College unanimously decided to extend the time for college attendance to *three full courses, extending over as many years*, and this requirement will go into effect with the beginning of the course in October, 1895.

This extension will enable the student not only to become more thoroughly grounded in the subjects which are a part of the curriculum, but will permit of the extension of the instruction in the direction of more advanced subjects, as well as those eminently practical. This action of the Board was not taken hastily, but was under serious contemplation for a number of years. Another step which has been contemplated for a still longer time, and which will also go into effect, is the granting of the degree of "Doctor in Pharmacy" to all who successfully complete the three years' course and pass the final examination.

The subject of granting the degree of Doctor in Pharmacy is by no means a new suggestion; it is true that the proposition was thoroughly considered twenty-two years ago by the conference of teaching colleges. The Philadelphia College, at this conference, while not disapproving of granting such a degree, felt that the time was not ripe, and *the instruction then given did not justify the change* then proposed. The degree of Graduate in Pharmacy was adopted by this College at the beginning of its career, when opposition to the establishment of the institution came from the physicians of Philadelphia who were interested in the work of the medical schools. It must be admitted that the founders of the College of Pharmacy acted wisely at the time, but since then the term "doctor" has outgrown the limited meaning which it then had, and has come to be recognized in many professions as the proper title to be bestowed upon a graduate of any professional college.

With the inauguration of the course extending over three years, with its added requirements and responsibilities, and the system of examinations at the end of each term, it is believed that such action is thoroughly justified. Pharmacy as a profession has, in the past,

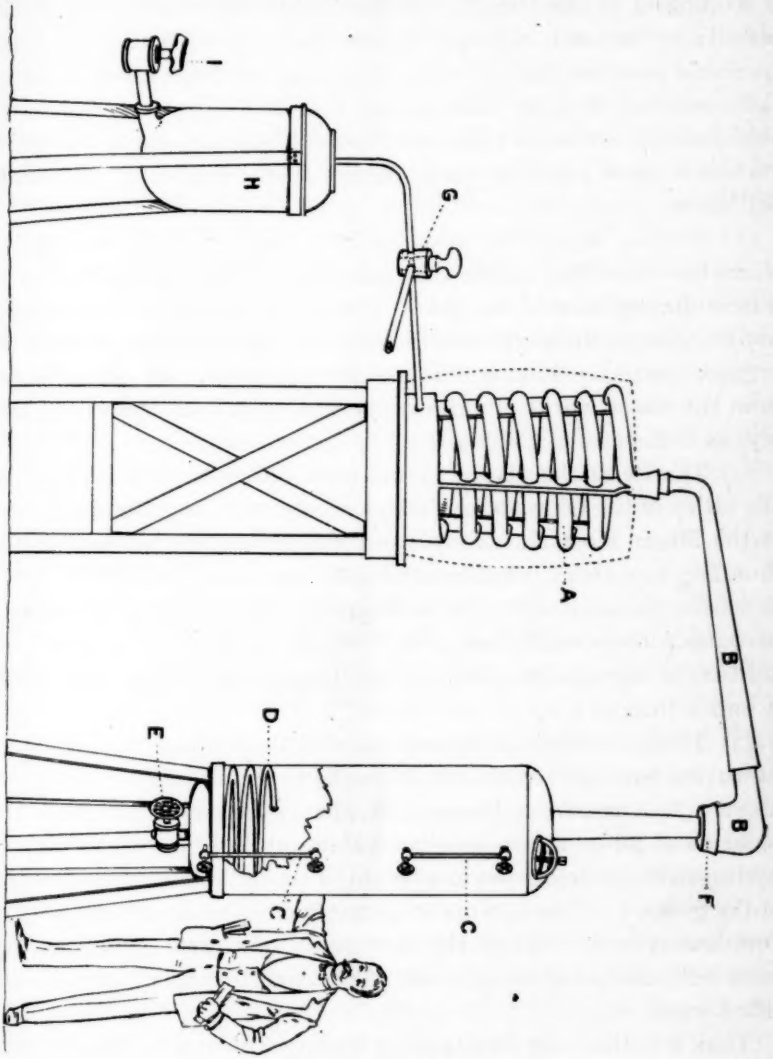
not received the *recognition from the public* which it has deserved. The colleges of pharmacy, without exception, have been maintained solely through the efforts of pharmacists themselves; we rarely or never hear of endowments or bequests from the general public to assist in their development. Public-spirited and self-sacrificing members of the pharmaceutical profession have freely contributed their services and their money for the buildings; carrying on the work, the students who have come for instruction have furnished the means for their support. It is true the latter have always been given an equivalent, and has not the time come when Pharmacy shall demand that recognition from the public which is her right?

The legislatures of our various States have recognized the principle that the pharmacist must be not only thoroughly educated in his profession, but must possess qualities which surely place him upon a professional plane; and is it not true that the people respect those who respect themselves? And while it is true that millions of great and good men have gone before, "untitled and unwept," and that titles alone do not make men, the Philadelphia College of Pharmacy believes that the time has come when it should give an education which shall command respect, and a title which will be recognized by the public as equivalent to that offered by other professional schools of no higher degree.

DISTILLED WATER.

By J. U. Lloyd.

Water condensed from the steam of boilers that are used as the source of mechanical power is usually contaminated with oil. This oil comes both from the exhaust steam water of the engine, which is usually returned to the boiler, and in some cases, additionally, from the substances used to prevent boiler incrustation, among which crude petroleum is often employed. In the latter case the water obtained from the condensed steam may contain large quantities of oil, amounting, perhaps, to enough to coat its surface with a film of grease. In either case, under the most favorable conditions, the water procured from such a source will not, in my experience, conform to the Pharmacopœial requirements for distilled water, neither can it well be used to make official distilled water.



DESCRIPTION.

A. Stoneware worm.
B, *B*. Stoneware head and arm.
C, *C*. Water gauges.
D. Steam coil for boiling the water.
E. Stop-cock for emptying the still.
F. Copper flange, connecting with stone head.
G. Three-way glass stop-cock.
H. Stoneware receiver.
I. Stoneware stop-cock.

According to the U. S. P., "Water" that will conform to certain tests is to be used in preparing distilled water. Persons in more favorable positions than Cincinnatians may, perhaps, obtain water of this condition of purity from natural sources. However, those situated as is the writer of this paper cannot hope to attain this desideratum without previous manipulation, as the following statements will show:

(1) Persons dependent upon surface drainage, such as supplies rivers like the Ohio, realize that quantities of mud are present in its waters during most of the year. This mud is mostly clay and sand, but associated therewith are to be found considerable amounts of organic matters. Thus it is impractical to obtain the official water from the water works of cities dependent upon such sources of supply, as is the city of Cincinnati.

(2) The ice of the glacier period is supposed to have scraped out the valley of the Ohio about Cincinnati, and also the tributaries such as the Miami River (just above) and Mill Creek (just below) the city, dumping into them great beds of sand and gravel, often to a depth of several hundred feet. These are reservoirs for unlimited amounts of water (driven well water), but beneath the city of Cincinnati this stratum is impregnated with sewage to such an extent as to render it impractical as a source of "Water."

(3) Then, beneath the gravel alluded to, is found the limestone formation through which artesian wells are sunk until at a depth of about 1,800 feet from the surface, the carboniferous formation is passed and saline water (artesian water), strongly impregnated with hydrogen sulphide, rushes to a height of several feet above the surface of the ground. This water is so strongly contaminated with sulphur compounds as to blacken the lead paint for a great distance about each well, and is seemingly out of the question as a source of distilled water.

Thus it is that, notwithstanding its impurities, we must naturally depend upon the water of the Ohio River, which is practically identical with the water upon which most of our river towns depend. It follows that, in order to make distilled water, we must, to be exact, purify the natural water at our command as a preliminary step, for it does not meet the U. S. P. requirements for water; but I take it that this precaution is unnecessary if the natural water, regardless of impurities, can be employed to make a product (dis-

tilled water) that will meet the official requirements. This point, so far as I know, has not been commented upon in print, with the water under consideration.

In order to determine if this is possible on a small scale, a half gallon glass retort, with a bent neck, was connected with a Liebig condenser. The connections were not luted, being made by means of corks, every endeavor being taken to avoid grease or soluble organic matter.

A preliminary charge of water was first distilled in order to insure the cleanliness of the apparatus and the connections, after which the pharmacopœial requirements were followed. Upon applying the most rigorous tests of the Pharmacopœia, no impurity could be detected in the reserved portions of the product.[1] The permanganate test resulted in but a slight decrease in the shade of pink, and after standing for ten hours, loosely tied over with two thicknesses of tissue paper, every fraction maintained its permanganate coloration. This demonstrated that the water of the Ohio River at the time of these investigations (February and March, 1895), if employed after the method prescribed by the Pharmacopœia, will produce official distilled water. On a small scale it can therefore be practically produced by means of any suitable distillatory device.

Next, an attempt was made to determine whether it is necessary to adhere strictly to the Pharmacopœial requirements as to detail. After suspending the operation in the evening, the exit of the condenser was plugged with absorbent cotton and allowed to rest over night. Next morning the retort was charged and distillation continued, the products being fractioned into successive portions of 100 c.c. each, until nearly the entire contents of the retort had been recovered. These successive fractions were tested and each fraction was found to conform to the Pharmacopœia, even the first fraction withstanding the permanganate test.

While, therefore, the Pharmacopœia wisely provides that the first fraction of distillate (one-tenth) be thrown away, it is seen that, with clean connections and proper apparatus, every portion of the

---

[1] Upon evaporation in clean glass vessels, however, visible rings resulted, which, although too slight to respond to weight, were perceptible. Further report will be made on this point in the future.

distillate withstood the requirements of the authority under consideration.

The various specimens of water were next subjected to more rigid tests than those Pharmacopœial (including Nessler's test also), and were found to maintain their records for purity. After boiling ten minutes with the permanganate, they were allowed to stand, tied over with tissue paper, for several days and under different exposures, without destruction of the pink coloration. Reference only is made to this fact now, as it is the intention to give detail test results at a future day.

The foregoing points having been determined in a general way, an endeavor was next made to obtain pure distilled water on a large scale.[1]

A chemical stoneware worm was made to order by the Doulton Pottery, London. It was 1 inch bore and 42 feet in length, all in one piece. To this a stone arm, connected with a stone head, was attached, thus providing that every portion of the surface touched by the condensed water should be of material unaffected by water. The head referred to sat loosely in a copper flange upon the apex of the lengthened exit of a new copper still. All connections were closed by absorbent cotton, no cement being employed.

The still was constructed of copper, being designed after the plan adapted for the concentration of such extractives as I do not wish to evaporate to dryness. In this case, instead of the usual false bottom for the steam jacket, a copper coil is thrown three times around the inside of the still, the lower line being one-tenth the space above the bottom of the still. Thus, with an extract or resin it is not necessary to watch the still constantly, for when the liquid contents are evaporated to the lower line of the coil, further evaporation ceases. All danger of injury by caking of the residue through forgetfulness is thereby overcome. The exit of the stone worm, in the present case, was provided with a three-way glass stop cock, one terminal being attached to a 25-gallon chemical stoneware jar, closed at the top and provided with a stone stop-cock at the bottom. The other terminal of the stop-cock was intended to divert the first portions of the distillate in case continuous distillation was found to

[1] After this paper was written, the *Chemiker-Zeitung*, No. 15, February 20, 1895, reached me, with description of a patented apparatus for making distilled water.

be impracticable. This, in general, describes the apparatus—shown in greater detail by the accompanying drawing—the comparison with the figure beside it showing the relative size of the various parts of the device.

First, a charge of 15 or 20 gallons of water was distilled in order to completely cleanse the apparatus. The first part of the distillate was found to be contaminated with oil that came from the new water-pipe connections through which the still was fed. Upon thoroughly cleansing them, however, no further trouble of this description was experienced. Finally, the water passed transparent, colorless and odorless, and was found to conform in every way to the requirements of the Pharmacopœia, excepting the matter referred to in note 1, p. 193. By Nessler's test no trace of ammonia could be detected.

Thus it was shown conclusively that the water of the Ohio River, at the time these investigations were made, would readily produce official distilled water. Not only did the large still, when operated according to the official method, produce water of a quality to meet the exactions of the U. S. P., but it does so by continuous distillation, regardless of fractionation, and it retains its quality from the first to the last part of a charge.

In considering, furthermore, the conditions necessary to insure reliable test returns, it is scarcely necessary for me to state that the reagents were exceptionally pure and free from dust, and were dissolved in pure, distilled water. The vessels employed to hold them, and the water-bottles as well, were previously cleaned with both caustic potash solution and sulphuric acid, and all subsequent finger-mark contaminations were carefully avoided.

The water operated upon contained 0·022 per cent. of solid matter, and the residue taken from the still after the operation deposited a heavy layer of yellow mud.

To persons convenient to clean, natural water, such a report as this may seem unnecessary, but to those who realize the necessity in this neighborhood of a correct understanding of the subject, the matter is important.

The evidence is unquestionably to the effect that pharmacopœial distilled water can be made, by means of suitable apparatus, out of the impure Ohio River water. Under what condition it subsequently alters, if at all under proper care, will be the subject of a future

paper, as exacting investigations in these directions are in process and will be carried on during the coming summer.

STRUCTURE OF VERATRUM VIRIDE.

By Edson S. Bastin.

This liliaceous plant is a perennial herb native to eastern North America, and ranging in its habitat from Canada to the Carolinas. It prefers damp localities, such as the borders of moist thickets, the banks of mountain streams, etc. Its erect, leafy stem rises to the height of from two to seven feet and, except in the inflorescence, is unbranching. The leaves are three-ranked, simple, broadly-oval, acute or acuminate, entire-margined, basi-nerved and plicate along the principal nerves, so that on their lower surface they present a strongly-ribbed appearance. They clasp the stem at their base and so ensheath it that a cross-section of its lower portion shows it to be enclosed in a succession of thin cylinders. The lower leaves, which are from six inches to a foot long, are the broadest, those above gradually decreasing in size and relative width to linear-lanceolate bracts, next the inflorescence.

The inflorescence consists of a terminal pyramidal panicle from eight to sixteen inches long, and composed of dense spike-like racemes of greenish-yellow, monœciously polygamous flowers, each subtended by a pointed bract.

The perianth consists of six pieces, the three outer (calyx) very similar in form and color to the three inner (corolla), except that they are a little longer. All of the pieces are distinct, or very slightly united at the base, lanceolate in outline, somewhat narrowed and thickish at the base, and ciliate-serrulate on the margin.

The andrœcium consists of six stamems, which are distinct, hypogynous, and shorter than the pieces of the perianth.

The gynæcium consists of a single, three-carpeled pistil, which is exteriorly three-lobed, and with three sessile, recurved stigmas. Internally, the ovary shows an axile placentation and numerous ascending anatropous ovules. The fruit is a septicidal capsule containing usually in each loculus from eight to ten flattish-oblong, membranous-margined seeds.

The plant is so similar to the European Veratrum album as to lead many botanists to regard it as only a variety of that species. The general aspect of the two plants, however, is quite different, ours having greener flowers, its panicles more compound, and the

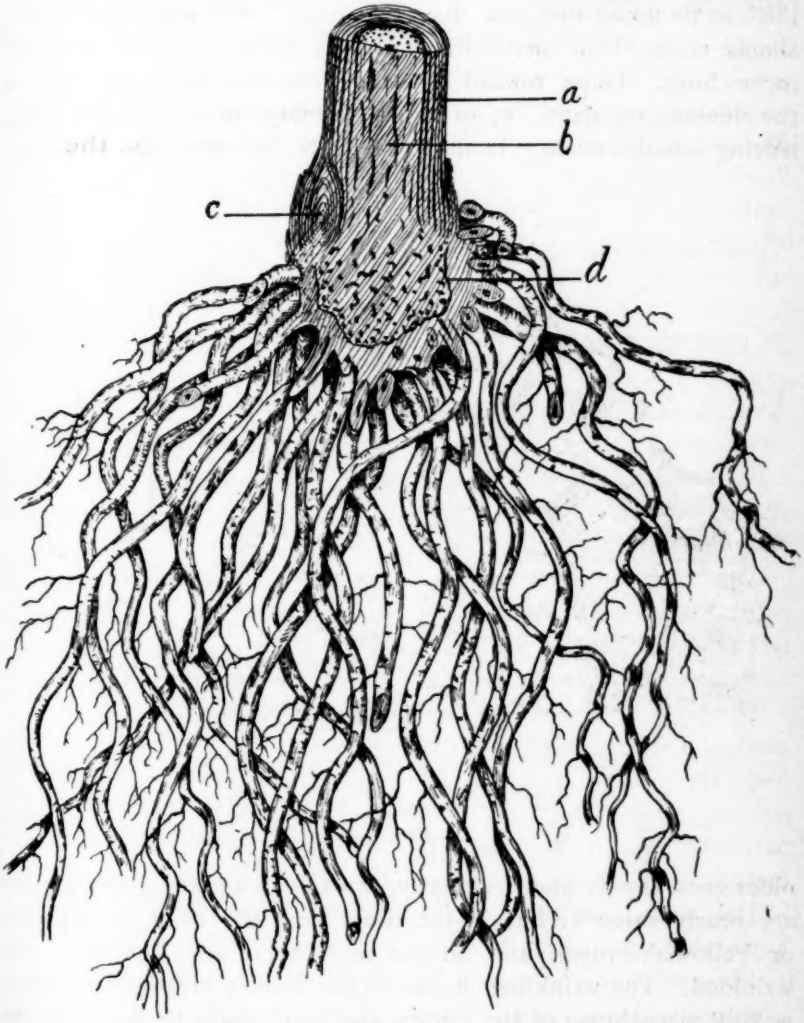


FIG. 1.

component racemes more loosely flowered and less regular, and also having its leaves more pointed. The plate illustration conveys an idea of the general appearance of the plant.

In our latitude the blossoming takes place in the latter part of June or early in July.

The rhizome is fleshy, upright or oblique, obconical, one and one-half to three inches long, and one to one and one-fourth inches thick at its upper end, and densely covered with somewhat fleshy, simple roots, about one-twelfth of an inch thick and from six to ten inches long. Those toward the somewhat truncate lower end of the rhizome are dead, or, in older rhizomes, even withered away, leaving rounded scars. In the fresh state the roots are white, the

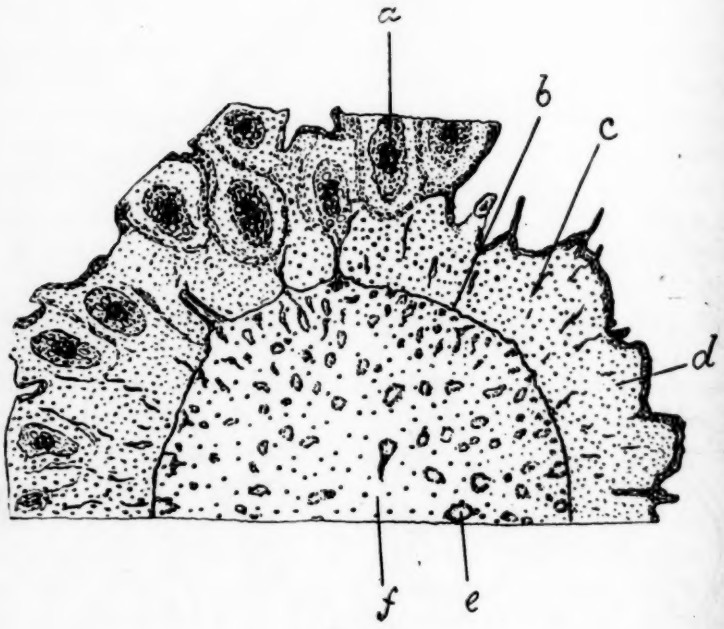


FIG. 2.

older ones closely and irregularly wrinkled, while the younger ones are nearly smooth; but in the dried form the color is yellowish or yellowish-brown, and all the roots are much shrivelled and wrinkled. The wrinkling is due to the loosely arranged and thin-walled parenchyma of the cortex, and particularly to the numerous large, lysigenous, intercellular spaces in the cortex. Toward the lower ends of the roots are numerous fine fibrils, which, however, are only sparingly present in the dried drug.

The central radial bundle of the roots is from eight to fourteen

rayed, with conspicuously large scalariform ducts at the inner ends of the xylem rays, and very small ones at the exterior ends. The cells of the endodermis have their outer walls thin, but those of its cells which come opposite the phloem masses are conspicuously thickened in their inner and radial walls. Those opposite the ends of the xylem rays are usually but slightly thickened.

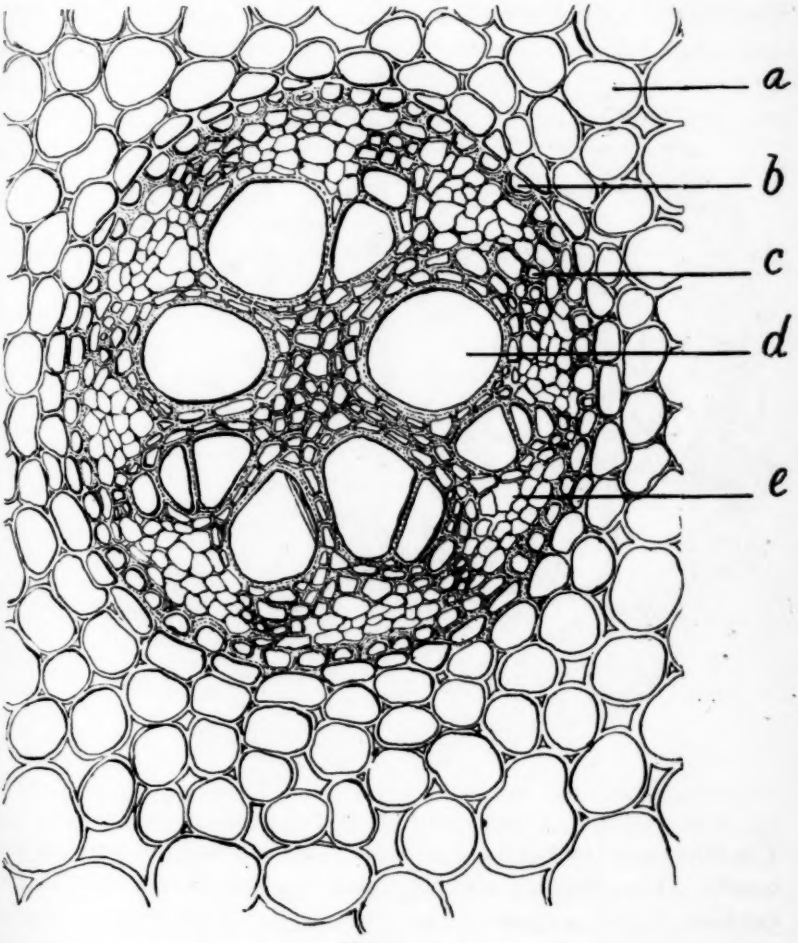


FIG. 3.

The rhizomes in the dried forms are dark brown, or blackish, exteriorly, usually crowned at their upper end with the remains of the solid above-ground stem, ensheathed by the numerous thin, tunicated leaf-bases. To facilitate drying, they are commonly split

in a longitudinal direction, into two or more wedge-shaped or flat pieces. The fracture is short, and the color, internally, whitish. The cross-section shows a distinct cylinder sheath forming an irregular dark line between the central cylinder and the thickish cortex. The bundles are of the concentric type, with a small central phloem surrounded by two or three layers of small-sized scalariform ducts and tracheids, and these are bounded exteriorly by an endodermis.

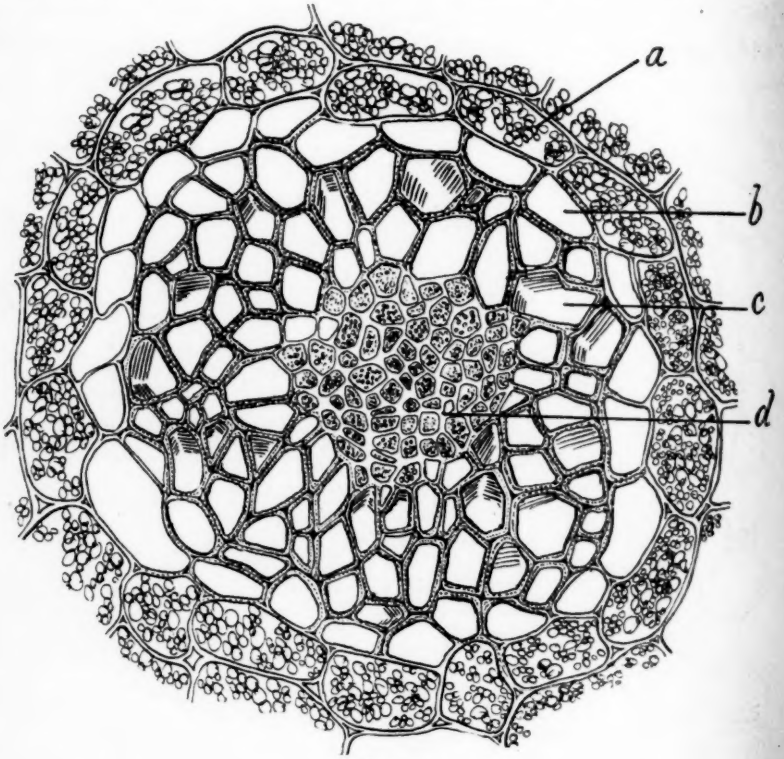


FIG. 4.

The ducts and tracheids are irregular in form and direction in the bundle. The bundles also pursue a very irregular course in the rhizome, so that a cross-section cuts some of them transversely, others longitudinally, and still others obliquely, giving rise to the appearance of numerous irregular brownish dots and wavy lines, imbedded in the whitish parenchyma. In the cortex, the wavy lines and dots are also present, but less numerous, and toward the outside are seen the sections of the root-bundles near their origin.

Owing to the peculiar course of its bundles, the appearance of the longitudinal section of the rhizome is not very unlike that of the transverse section.

The parenchyma of both roots and rhizome is rich in small-grained starch, and there are also in both scattered cells containing bundles of needle-like raphides.

The starch grains are sometimes nearly spherical, simple, and with a central, and often fissured, hilum; but they are more frequently compound, consisting of two, three, or sometimes of a larger number of easily separable grains. Stratification lines are only recognized with difficulty, even in the largest grains.

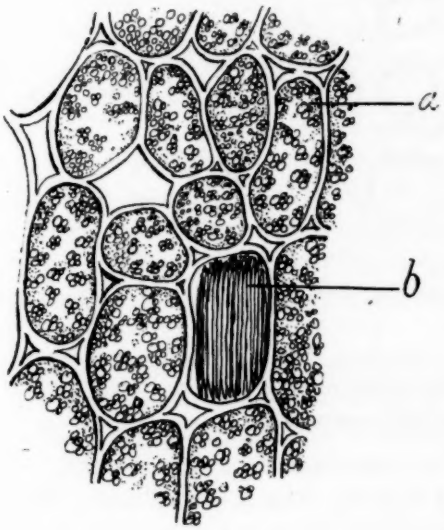


FIG. 5.

The writer has observed in one instance the fraudulent substitution of the rhizome and rootlets of Symplocarpus fœtidus for those of Veratrum viride. The drug was so prepared that the incautious purchaser might easily have mistaken it for the genuine article, but the fraud could not have deceived a careful observer, for the roots of Symplocarpus are much coarser, averaging at least an eighth of an inch in diameter; the rhizomes also average considerably larger, the cortex is relatively thicker, the structure of the rhizome is more porous, the starch grains are much smaller, and the leaf-bases at the top are much less numerous and not tunicated. The fœtid odor of

Symplocarpus is also characteristic; but when the drug has been kept for some time, this odor becomes faint, or entirely disappears, and so is less reliable than the structural characters as a means of identification.

As between the rhizomes of Veratrum album and those of Veratrum viride, it would indeed be very difficult to distinguish by structural, or any other characters, if the drugs were trimmed alike. Fortunately, however, this is not the case, the rhizomes of Veratrum

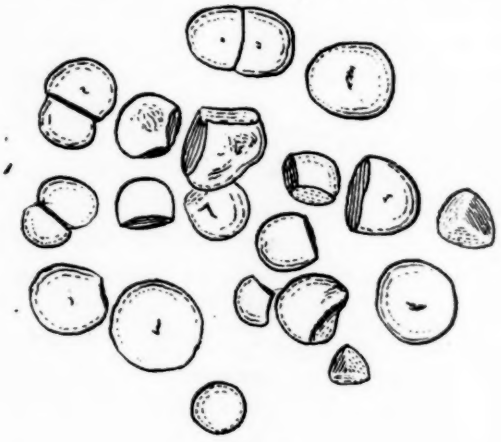


FIG. 6.

album having the roots mostly trimmed away, while those of Veratrum viride are not removed.

DESCRIPTION OF FIGURES.

Plate.—Plant of Veratrum viride in natural colors, about one-sixth natural size.

Fig. 1.—Longitudinal section of fresh rhizome, about one-half natural size. *a*, tunicated leaf-bases; *b*, above-ground stem; *c*, lateral bud; *d*, cylinder sheath.

Fig. 2.—Diagram of half of cross-section of rhizome magnified about five diameters. *a*, section of root near its origin; *b*, cylinder sheath; *c*, one of the wavy bundles in cortex; *d*, cortical parenchyma; *e*, a bundle of the central cylinder; *f*, parenchyma of the central cylinder.

Fig. 3.—Portion of cross-section of root, showing central radial bundle and a little of the surrounding cortex. *a*, cell of cortical parenchyma; *b*, endodermal cell opposite phloem mass; *c*, small duct at outer end of xylem ray; *d*, large duct at inner end of xylem ray; *e*, phloem mass. Magnification, 250 diameters.

Fig. 4.—One of the bundles of the rhizome, as seen in cross-section, magnified 370 diameters. *a*, cell of parenchyma exterior to bundle; *b*, cell of endo-

dermis; *c*, scalariform tracheid in xylem; *d*, phloem tissues occupying centre of bundle.

Fig. 5.—Small portion of parenchyma of rhizome, magnified 230 diameters. *a*, cell heavily charged with fine-grained starch; *b*, cell containing a bundle of raphides.

Fig. 6.—A few starch grains of Veratrum viride, magnified 1,200 diameters.

THE CHLORINATED COMPOUNDS OF THE U. S. P.

By Chas. H. LaWall, Ph.G.

In the Pharmacopœia of 1890 the strength of the two chlorinated compounds was made uniformly higher than in the previous edition of the same work, the strength of *Calx Chlorata* being changed from 25 per cent. to 35 per cent. of available chlorine, and the strength of *Liquor Sodæ Chloratæ* being changed from 2 per cent. to 2·6 per cent. of available chlorine.

The former of these two articles is beyond the jurisdiction of the pharmacist, regarding its preparation, as it can be made more economically and satisfactorily on the large scale. *Liquor Sodæ Chloratæ*, however, is prepared in every carefully-managed pharmaceutical establishment, as it can be economically and expeditiously made on the small scale, and is all the better for being freshly manufactured.

The present official process for the preparation of solution of chlorinated soda is not satisfactory in all respects. The principal difficulty consists in allowing just enough chlorinated lime, of the full official strength, to produce a finished preparation, also of full official strength.

As will presently be shown, the strength of a number of samples of chlorinated lime, which were examined by the writer of this article, was found to be far below the official standard; but, even granting that this were not the case, and that the strength of chlorinated lime is uniformly 35 per cent., it would still be extremely difficult, if not impossible, to make solution of chlorinated soda of standard strength by following the present official process.

In a series of carefully conducted experiments upon known quantities of the substance, whose strength was in all cases previously ascertained, the writer was unable, at any time, to extract all of the available chlorine from a sample of chlorinated lime, by exhausting it as the Pharmacopœia directs. The process in the Pharmacopœia

directs that the chlorinated lime shall be exhausted of its available chlorine by repeatedly triturating with water and pouring off the supernatant fluid, and subsequently pouring the residue upon the filter, washing it with the remainder of the water, the proportion of water used in exhausting it being to the chlorinated lime as $6\frac{2}{3}$: 1; this solution is then mixed with the solution of sodium carbonate, and the mixture subsequently filtered.

In the process of the 1880 Pharmacopœia, the chlorinated lime was mixed with four times its weight of water, and the solution of carbonate of soda poured into the mixture. The preparation was allowed to stand for a certain length of time, after which it was strained through muslin, allowed to settle, and the clear liquid removed afterward by means of a syphon.

Much has been written concerning the composition of chlorinated compounds, and of chlorinated lime in particular; but from a rational view of the subject, it would be more natural to suppose that the process in which the decomposing action of the sodium carbonate is brought to bear upon the whole bulk of the chlorinated lime, instead of upon washings of it, which have been found to be far from uniform, would be the one to give the greater percentage of available chlorine. The results from several careful experiments upon the practicability of completely exhausting a given sample of chlorinated lime, show the following average:

The first trituration extracted less than the second, and the available chlorine remaining in the residue amounted to about 10 per cent. of the total.

	Per Cent.
The total available chlorine in the sample was taken as	102·00
Amount extracted by first trituration	33·28
Amount extracted by second trituration	40·58
Washings of residue extracted	14·41
Available chlorine determined in residue	11·04
Total	99·31

Working with the two processes simultaneously, and using chlorinated lime of the same strength in both instances, the writer was unable, in any case, to obtain a product by the 1890 process, which contained as much available chlorine as that made by the 1880 process.

This appears to be due, in a great measure, to the two operations of filtration which are embodied in the present official process, and in both of which cases the residue is very difficult to exhaust completely.

Given the same degree of care and attention, the 1880 process affords a better preparation in a shorter time, both of which results are of unquestionable advantage.

After an experience of manufacturing over 300 gallons of the preparation, within three weeks (to be used in the flooded districts of Pennsylvania during the spring of 1894), it is the opinion of the writer that the 1880 process, which was used after one trial of the present process, which trial proved unsatisfactory, is by far the better of the two, as it was found by using it, that a preparation containing a larger percentage of available chlorine could be made with a decided saving of both time and labor. It also occurred at the time that the injunction to dispense a clear liquid was somewhat unnecessary, as the liquid syphoned off, while still slightly cloudy, was by no means unsightly; and the filtration which was necessary to produce a clear liquid, without waiting for it to settle, added to the time, labor and cost of preparation, while it in no wise added to its good qualities.

While working upon this subject a few experiments were also made to test the validity of the following assertion, which is made in the United States Dispensatory, page 825. "When it (solution of chlorinated soda) is boiled, chlorine is not given off, nor is its bleaching property sensibly impaired, and when carefully evaporated a mass of damp crystals is obtained, which, when redissolved in water, possesses the properties of the original liquid."

The following experiments were performed with the accompanying results.

The first sample was evaporated upon a water bath almost to dryness, the residue dissolved and water added to restore the original volume. The loss was 1·205 per cent. of available chlorine.

Sample number two was evaporated to a small volume in an air bath, temperature 60° C., and redissolved as before. The loss of available chlorine amounted to ·597 per cent. The third sample was evaporated to complete dryness in the air bath, and the original volume restored as in the previous cases. The loss was 1·644 per cent. of available chlorine. These experiments show that, while

the original properties of the liquid may be recovered, it is accompanied by a diminution of strength.

50 c.c. of the solution were exposed to spontaneous evaporation in the laboratory; after twenty-four hours the liquid was found to have gained ·122 per cent. in strength, and after forty-eight hours it had gained ·593 per cent. This would indicate that a preparation deficient in strength might be brought up to the official standard by carefully evaporating some of the solvent, but no experiments on this subject were performed with large quantities.

The results which were attained by these investigations would indicate that the process for the preparation of solution of chlorinated soda should be more thoroughly tested before the next revision of the Pharmacopœia.

The strength of the market samples of chlorinated lime, as referred to in the beginning of this article, was also investigated with the results as tabulated below.

Number.	Per cent. of available Cl.	Condition.	Remarks.
1	35·15	dry	Bulk stock.
2	6 2	moist	Pasteboard box.
3	32·68	damp	Pasteboard box.
4	25·69	damp	Pasteboard box. Same brand as No. 3.
5	32·38	dry	Pasteboard box. Same brand as Nos. 3 and 4
6	32·25	dry	Bulk Stock.
7	14·64	damp	Pasteboard box. Bore guarantee of full strength.
8	9·35	moist	Pasteboard box. Same brand as No. 2.
9	38·36	dry	Bulk stock.

The samples were procured from a variety of trade sources, and it is thought that they fully represented the market condition of the substance. In 1892, before the recognition of the new standard, Dr. E. R. Squibb examined eight market samples with an average of 28·66 per cent. (Ephemeris, page 1330). The average of the above nine specimens was but 25·20 per cent., but there were several samples which were of scarcely any value whatever, and eliminating these, the average would be fairly good, but not yet up to the standard. Evidently the pasteboard containers do not preserve the

substance for a great length of time, as the bulk stock samples, which were presumably fresh, were higher in percentage than those in the pasteboard boxes, which had no doubt been kept in stock for some time.

305 CHERRY STREET, PHILADELPHIA.

CHEMICAL EXAMINATION OF SOME COMMERCIAL VARIETIES OF CACAO.

BY WILLIAM E. RIDENOUR.

Contribution for the Chemical Laboratory of the Philadelphia College of Pharmacy. No. 138.

This paper is confined exclusively to the chemical examination of some commercial varieties of Cacao and is intended to supplement Professor Edson S. Bastin's publication, "Starches in Commercial Varieties of Cacao," AM. JOUR. PHARM., 1894, page 369.

The present work was carried out in the Chemical Laboratory of the Philadelphia College of Pharmacy, under the direction of Professor Henry Trimble.

The following are the varieties of Cacao examined: Bahia, Surinam, Java, Trinidad, Roasted Trinidad, Ariba, Caracas, Roasted Caracas, Granada, Tobasco, Machalle, Maracaybo.

The process will first be given and the results then tabulated.

Estimation of Fat.—Three grammes of the beans were finely comminuted with an equal bulk of purified sand and this mixture extracted with petroleum ether in a Soxhlet apparatus for 10 hours, although afterwards a shorter time was found sufficient for complete exhaustion.

The percolate was transferred to a tared beaker, evaporated and dried under a desiccator until of a constant weight (when dried at 100° C. the character of the butter appeared to be changed, as it remained liquid at normal temperatures for several days).

Estimation of Alkaloid, Theobromine.—P. Suss's process (*Ztschr. f. Anal. Chem., Apotheker Ztg.*, 1893, 78; AM. JOUR. PHARM., 1893, 170) was used for the estimation of the alkaloid. The residue, after separating the fat, was boiled for one-half hour with 200 c.c. of distilled water and six grammes of freshly-prepared pure lead hydrate, strained, expressed and filtered; the insoluble portion was boiled twice with 100 c.c. of distilled water and the united filtrate evapor-

ated to 10 c.c., transferred to a separating funnel and agitated for three minutes with 100 c.c. of chloroform. After complete separation of the chloroform, requiring about three hours, the latter was removed and the operation repeated three times.

From the combined chloroform solutions, the greater portion of the solvent was distilled off, the remaining portion transferred to a tared beaker, the flask rinsed with warm chloroform and the contents of the beaker evaporated to dryness in a water bath.

The theobromine was obtained in the form of almost perfectly white microcrystalline powder, which observation agrees with P. Suss, but is contrary to the assertion made by Wanklyn (Cocoa and Chocolate Analysis, page 48).

Estimation of Albumen.—The nitrogen was estimated by the Kjeldahl process; and the percent. found multiplied by the factor 6·25 gave the amount of albumen.

Estimation of Glucose, Saccharose and Starch.—The powdered beans, after extracting the fat, were treated with 100 c.c. of distilled water, filtered and then twice again extracted with 50 c.c.; the united filtrate was divided into two equal parts; in one portion the glucose was estimated by Fehling's solution; the other portion was boiled three hours with dilute acid to convert the saccharose into glucose, and was then estimated by Fehling's solution.

The difference between the first and second reduction gave the reducing effect due to saccharose.

The residue from the above was boiled three hours with acidulated distilled water, to convert the starch into glucose, filtered, and the glucose estimated in the filtrate by the above process and calculated into starch.

Lignin and Cellulose.—Ten grammes of the powdered beans were extracted in a Soxhlet apparatus with petroleum ether for eight hours, or until exhaustion of the fat was complete; the residue was dried and then treated with 200 c.c. of hot distilled water, strained, expressed and filtered; this operation was repeated twice. The residue from this hot-water extraction was next treated with alkaline water until the color, which was very deep in the first alkaline water, was no longer given to the filtrate.

The insoluble portion was next treated with acidulated water.

After extracting with these four solvents the residue was dried to a constant weight and then treated with chlorine water for twelve

hours; the insoluble matter was again dried and weighed and the loss calculated as lignin. The residue was then incinerated and the loss estimated as cellulose.

Moisture and Ash.—The moisture was obtained by drying two grammes of the powdered beans at 100° C., in an air-bath to a constant weight. The residue was incinerated, which, when weighed, gave the ash. A qualitative examination of the ashes gave the following general constituents:

Potassium.	Phosphates.
Magnesium.	Sulphates, trace.
Calcium.	Chlorides, trace.
Sodium.	Carbonates, trace.
Silica.	

Iron was found in varying quantities in all except the Tobasco beans.

Weight of Beans.—The determination of the weight of one bean was found by taking the average of fifty beans:

	Grammes.
Bahia	·856
Surinam	1·175
Java	·994
Trinidad	1·295
Ariba	1·434
Roasted Trinidad	1·189
Caracas	1·447
Granada	·920
Tobasco	1·266
Machalle	1·237
Maracaybo	1·364
Roasted Caracas	1·214

	Bahia.	Surinam.	Java.	Trinidad.	Ariba.	Caracas.	Granada.	Roasted Trinidad.	Tobasco.	Roasted Caracas.	Machalle.	Maracaybo	Average.
Fat (cacao butter)	42·10	41·03	45·40	43·66	43·31	36·81	44·11	41·89	50·95	37·63	46·84	42·20	42·99
Theobromine	1·08	·93	1·16	·85	·86	1·13	·75	·95	1·15	·99	·76	1·03	·97
Albuminoids	7·50	10·54	9·25	11·90	10·14	10·59	9·76	12·02	7·85	12·36	12·69	11·56	10·51
Glucose	1·07	1·27	1·23	1·38	·42	2·76	1·81	1·48	·94	1·76	1·60	1·09	1·40
Saccharose	·51	·35	·51	·32	6·37	1·56	·55	·28	2·72	·51	·46	1·36	1·29
Starch	7·53	3·61	5·17	4·98	1·58	3·81	6·27	5·70	3·51	6·07	1·35	1·69	4·27
Lignin	7·86	3·90	6·10	5·65	4·62	3·28	5·55	5·87	6·44	9·15	5·95	7·16	5·95
Cellulose	13·80	16·24	13·85	13·01	14·07	16·35	13·49	19·64	12·57	11·69	11·32	17·32	14·44
Extractive matter (by difference)	8·99	13·53	8·90	8·31	9·00	12·72	9·72	5·84	9·26	9·22	9·02	6·79	9·30
Moisture	5·96	5·55	5·12	6·34	5·90	6·63	5·28	2·63	1·55	5·69	5·86	5·67	5·18
Ash	3·60	3·05	3·31	3·60	3·73	4·36	2·71	3·70	3·06	5·03	4·15	4·13	3·70

THE DETERMINATION OF PYROPHOSPHORIC ACID IN THE PRESENCE OF ORTHOPHOSPHORIC ACID AS APPLIED TO SOLUBLE IRON PYROPHOSPHATE, U. S. P.

By J. B. Nagelvoort.

(Received for publication, Jan. 16, 1895.)

(1) Fresenius teaches, that the precipitate obtained upon the addition of *magnesium sulphate* to an aqueous solution of a pyrophosphate of an alkali, $Mg^2P^2O^7$, is soluble in an excess of the pyrophosphate, as well as in an excess of the magnesium sulphate.

(2) Th. Salzer remarked, in the *Archiv der Pharmacie*, Band 232, Heft 5, p. 371, 1894, "*Ueber Natrium pyrophosphate*," that it is "doubtful if this solubility of the precipitate is a characteristic property of pyrophosphates."

He published the remarkable experience that he found an orthophosphoric acid, which showed all the identity reactions of a pyrophosphate, with the exception of the one with potassium permanganate. The orthophosphoric acid that led to this discovery was contaminated with one-fourth of an acetyl compound of one of the oxyacids of phosphorus. A sodium salt of this compound, mixed with 5 parts sodium diorthophosphate, gives a *pure white* precipitate with silver nitrate solutions, this white precipitate being the well-known identity reaction for pyrophosphoric acid.

Writing *phosphoric acid*, according to Gerhardt's type theory,

$$\left.\begin{matrix} PO \\ H^3 \end{matrix}\right\} O^3$$

and replacing one atom H with the radical,

$$C^2H^3,$$

we have for Salzer's acetyl compound,

$$\left.\begin{matrix} PO \\ H^2 \\ C^2H^3 \end{matrix}\right\} O^3 .$$

(3) It will be readily conceded that Salzer's experience is of importance to us, and that a wider knowledge of it may end the doubt and confusion for manufacturers of pyrophosphates, and for dispensers of it, in which, unfortunately, the seventh edition of the U. S. P. leaves its readers where they have to make a determination of pyrophosphates in the presence of orthophosphates.

(4) The prescription of the U. S. P. which is referred to here (p. 193) is all very well for an expert analyst. But it does not work well with less experienced operators. The writer received, lately, official complaints from manufacturers of pyrophosphates, that they objected to the application of the U. S. P. test for purity of their article, *i. e.*, absence of orthophosphates.

(5) I agreed. But they seem not to have read an article by my colleague, Prof. Dr. Julius Stieglitz, on the previous Pharmacopœia, or it has escaped their memory (*Am. J. Ph.*, 1891, p. 585).

(6) The reader is requested, to prevent misunderstanding, to operate literally, as is here prescribed. This will furnish proof to any unbiased mind that it is better to make the determination of pyrophosphoric acid in the presence of orthophosphoric acid, according to Fresenius, than according to the *U. S. P.*

(7) "If 1 gm. of the salt *be boiled* with 10 c.c. of potassium hydrate T.S., a reddish-brown precipitate will be produced, and if the colorless filtrate from this precipitate be *strongly* acidulated with hydrochloric acid, then *magnesia mixture* added, and subsequently *a slight excess* of ammonia water, no precipitate should be produced."—*U. S. P., p. 193.*

(Italics are mine.)

(8) This somewhat vague prescription (see italics) is a source of fatal errors to an operator of limited experience in analytical chemistry.

Two (2) c c. magnesia mixture seem to be a fair proportion for the colorless filtrate, and *five* (5) drops of ammonia water furnish the slight excess of the latter.

In five commercial samples, used for this paper, I did not obtain an orthophosphoric acid reaction with two (2) c.c. magnesia mixture and five (5) drops of ammonia water. *Orthophosphoric acid* was, however, largely present in all the samples, as is shown below, where other results are recorded, obtained from the same samples.

I found that many iron pyrophosphates in the market are only pyrophosphates in name; that pyrophosphoric acid, for economy's sake, perhaps, is only to be found on their labels.

(9) The confusion of the quoted vague prescription of the U. S. P. is to be avoided as follows (to which Dr. Stieglitz called attention already years ago):

Dissolve 1 gm. of the salt under examination, for the determination of pyrophosphoric acid, in ten (10) c.c. of water.

I do not advise boiling. There is no necessity for it. When the salt is dissolved, add 10 c.c. of a 10 per cent. solution of potassium or sodium hydrate; stir and filter, after a little while, into a 25 c.c. graduate. You will obtain between 12 and 15 c.c. colorless filtrate. (Perforate the filter, and submit the mixture of the salt, and the potassium or sodium hydrate solution to a somewhat longer contact *if not colorless.*)

Add five (5) c.c. of a 10 per cent. ammonium chloride solution, and *drop by drop*, from a pipette, from 1 to 2 c.c. of a 10 per cent. magnesium sulphate solution. Shake the graduate slowly as long as the precipitate, that forms, redissolves. *Do not stir vigorously.*

In this way, orthophosphates of the alkalies can be separated from pyrophosphates, a similar manner of separating as is in use in the separation of narcotine from morphine, in opium assaying, according to the process of Dieterich (*Helfenberger Annalen*). Orthophosphate of ammonia and magnesia forms later, if present, and sinks to the bottom of the graduate, as a distinctly different microcrystalline substance.

When the filtrate *remains* clear, no orthophosphate is present.

These proportions of ammonium chloride and magnesium sulphate, and the conditions under which the reactions took place, were found favorable for the determination of alkali pyrophosphates in six commercial samples of different manufacturing companies.[1]

If a precipitate *has* formed, it must be collected on a small filter, washed and dissolved on the filter in dilute nitric acid; the acid solution of it has to be made slightly alkaline with ammonia water; the precipitate that hereby forms has to be redissolved in dilute acetic acid, and this solution has to be tested for orthophosphoric acid with a 5 per cent. silver nitrate solution. A canary yellow precipitate indicates the presence of orthophosphates.

(10) Where the text of the U. S. P. reads:

"If a portion of the filtrate be acidulated with acetic acid and heated to boiling,"

it should read, according to the proposition in this paper:

"If a portion of the filtrate from a precipitate, if any, is formed by the addition of the ammonium chloride and magnesium sulphate solution, or from the colorless filtrate mixed with ammonium chloride and magnesium sulphate, if no precipitate is formed . . . ."

---

[1] Dr. Stieglitz detected, by taking much less magnesium sulphate, one (1) part orthophosphate in nine (9) parts pyrophosphate.

because very frequently we have to do with a mixture of ortho- and pyrophosphates.

$$Na^2 HPO^4 + NH^4 OH + MgSO^4 =$$
$$Mg(NH^4)PO^4 + Na^2 SO^4 + H^2O.$$

(11) Neither Fresenius, Flückiger nor E. Schmidt mentions in their well-known respective text-books how sensitive the silver nitrate test is for orthophosphates. I do not know if this has been given elsewhere. Since it is valuable to know, from a pharmaceutical and chemical standpoint, "about" how much orthophosphates a silver solution detects, experiments were made—0·001 g. could be found. The reaction with molybdate solution is sensitive on orthophosphates in the fifth decimal place. Quantitative estimations of phosphoric acid are uncalled for.

"Wer dies aber wissen muss,
Der kauft sich ein Fresenius."

(12) *Strongly acidulating* with hydrochloric acid and then adding magnesia mixture in *unlimited* quantity [see (7)] is another source of error. Fresenius teaches that magnesia mixture should not be used in too excessive quantities.

In one sample (No. 6), which was nearly pure pyrophosphate, five (5) c.c. magnesia mixture and one (1) c.c. ammonia water, gave a precipitate which did not visibly dissolve. *On the authority of the U. S. P., this sample would have, therefore, been condemned.* This precipitate gave a *white* color reaction with silver nitrate solution, after it was collected, washed, dissolved in dilute nitric acid, reprecipitated by ammonia and redissolved in dilute acetic acid.

It is repeated here that the pyrophosphate was "nearly" pure; that the precipitate did not visibly dissolve, because:

(1) The colorless filtrate of the mixture of the salt with potassium hydrate solution remained clear with two (2) c.c. of magnesia mixture and five (5) drops ammonia water, for a day. With 0 5 c.c. ammonia water, the same results.

(2) The molybdate test showed only traces of orthophosphoric acid.

(3) The experienced eye detected a yellowish tinge in the white silver precipitate, when a larger quantity of the silver solution was added after the first portion, whereby the white precipitate was thrown down.

I hope that this paper will be of some use to my colleagues, so that we may act harmoniously in the spirit of our law-book, which is purity of medicines, instead of being obliged to shield inferior products with its shortcomings.

AUSTRALIAN SANDARACH.

By J. H. Maiden.

(Issued by the Department of Agriculture, New South Wales, and communicated by the author.)

Introductory.—It is a matter of common observation that a number of raw vegetable products of more or less importance are going to waste in Australia, simply because our people are ignorant of their properties and value. I can hardly cite a better instance than that of Australian Sandarach. Here we have a product absolutely and entirely identical in chemical and physical properties with a well-known article in regular demand. The price of this article at London auction sales is shown by the figures I give below (Appendix A), while its cost in Sydney is very much enhanced; and yet we actually import from Algeria, via London, at this high price, what is common enough in parts of New South Wales, and to be had for the gathering. The trees from which this resin (for Sandarach is a resin) exudes are the well-known Cypress Pines of this Colony, some species of which are found in the coast districts and table-lands, but they are far more largely developed in the drier parts of the Colony.

The collection of Australian Sandarach is one of those minor industries which could be readily undertaken by a family of children. As the resin flowed from the Cypress Pines, it could be accumulated in clean dust-proof tins, until a sufficient quantity was obtained to be sold to the local store-keeper, who would again sell to the wholesale chemist, or wholesale oil and color-man of Sydney. Sandarach is usually graded. There would be no difficulty in grading locally our local product, while any surplus available for export could be shipped without grading if found expedient.

I have no means of getting at the consumption of Sandarach in this Colony, but we ought to be able to supply the local demand and have a good surplus for export.

With these introductory remarks, I will give some further information in regard to Sandarach and Australian Sandarach, based upon a paper "On Australian and Tasmanian Sandarach," written by me and published in the proceedings of the Royal Society of Tasmania in 1889. I do hope that educated men who may read what I have to say, and whose inclinations or duties carry them into districts where the native Cypress Pines grow, will take the trouble to encourage settlers and others to collect the product referred to.

Notes on Sandarach.—The Sandarach or gum juniper of commerce is the product of a *Callitris* (*quadrivalvis*), which grows in North Africa. The following summary of its uses is taken from Morel (*Pharm. Journ.* [3] viii, 1024): "According to Gubler, the Arabs used it as a remedy against diarrhœa, and to lull pain in hæmorrhoids. The Chinese used one kind (*C. sinensis*) as a stimulant in the treatment of ulcers (as promoting the growth of flesh), as a deodorizer, and to preserve clothes from the attacks of insects. In Europe it is used very little in medicine. It is most frequently employed as an ingredient in varnish, to increase its hardness and glossiness. It is used also as a fumigant, and in powder ('pounce') to dust over paper from which the surface has been scraped, to prevent the ink from running. It rarely enters into the composition of plasters."

Ordinary Sandarach exudes naturally, but the practise in Northern Africa is to stimulate the flow, making incisions in the stem, particularly near the base, and this hint might be borne in mind by our people.

When our Cypress Pines are wounded, the resin exudes in an almost colorless, transparent condition. It has obviously high refractive power, and is much like ordinary pine resin in taste, smell and outward appearance, when the latter is freshly exuding. This transparent appearance is preserved for a considerable time, the resin meantime darkening a little with age. Old samples possess a mealy appearance, but this is merely superficial. The origin of this appearance has been explained as follows in regard to *Sandarach*, and doubtless the simple explanation holds good here: "The surface of the tears appears to be covered more or less with powder, but this character is not to be attributed, as alleged by Herlant (*Etude sur les produits résineux de la famille des conifères*, p. 38), to the friction of the fragments one against another; but, as has been

ascertained by a microscopical examination by Dr. Julius Wiesner (Die chemisch-technisch verwendte Gummiarten, *Harze und Balzame*, 1869, p. 129), to the unequal contraction of the resin while drying, resulting in a mass of fissures that form, as in the case of several kinds of copal, facets that gradually separate from the mass and constitute the 'powder' of many authors." (Morel, *op. cit.*) Evidence against Herlant's supposition is also found in the fact that resins of the *Sandarach* class are nearly *white on the trees* after they have been exuded some little time, showing that the appearance is brought about by exposure to the weather.

Australian Sandarach.—Australian Sandarach burns readily, and on the Snowy River (near the Victorian border) it is often mixed with fat by the settlers to make candles. The aborigines used frequently to use it for a similar purpose. Sir Thomas Mitchell (*Three Expeditions*, ii, 37) says: "Each carried a burning torch of the resinous bark of the *Callitris*, with the blaze of which these natives (Lachlan) seemed to keep their dripping bodies warm."

The *Callitris* resins soften slightly, but do not melt in boiling water, and a sample of commercial Sandarach behaves similarly. In the mouth they feel gritty to the teeth, and in no way different to Sandarach. When freshly exuded they are very irritating to a cut.

I will reiterate, at this place, in order to save time, that the properties of Sandarach are shared by Australian Sandarach; I do not know in what respect they differ, and the one article may be substituted for the other.

It was a specimen of resin from the Oyster Bay Pine of Tasmania, sent to the exhibition of 1851, which first drew the attention of experts to the possibilities of Australian Sandarach. For "the fine pale resin of the Oyster Bay Pine (*Callitris australis*) from the eastern coast of Van Diemen's Land" and other gums and resins, Mr. J. Milligan was awarded honorable mention (*Jury Reports*, 1851, *Exhibition*, p. 182).

I have only alluded to naturally-growing trees, but Baron von Mueller states: "Probably it would be more profitable to devote sandy desert land, which could not be brought under irrigation, to the culture of the Sandarach Cypresses than to pastoral purposes, but boring beetles must be kept off." Of course, Cypress Pine timber is very valuable, as it is ornamental, and one of the best of

our timbers to resist white ants, but I propose to confine myself to the resin in this paper.

The various kinds of Cypress Pines.—Our Cypress Pines all belong to the natural order Coniferæ (Cone-bearers), and are therefore allied to the pines, firs, spruces, etc., of the Northern Hemisphere. They belong to the genus *Callitris*, which is mainly a synonym of *Frenela*. [The word *Callitris* is from the Greek *Kallos*, beautiful, in allusion to the appearance of the trees. *Frenela* is in honor of M. Frenel, a former member of the French Academy.]

In the Australian Colonies there are twelve species of *Callitris*, and some of them have varieties more or less marked, so that there are a goodly number of Australian Cypress Pines. Four of the species (*Roei*, *Drummondii*, *Actinostrobus* and *acuminata*) are confined to Western Australia, and have, of course, but a limited interest to us in the eastern colonies. *C. oblonga* is only found in Tasmania.

The Cypress Pines that are found in New South Wales, and which therefore especially interest us, are seven, namely:

(1) *Callitris Macleayana.* "Port Macquarie Pine," an elegant species now often seen in gardens.

(2) *C. Parlatorei.* "Mountain Cypress Pine." "Stringybark Pine." These two species are closely allied, and are both found in the North Coast districts. They are not as abundant nor do they yield Sandarach as freely as the other species.

(3) *C. verrucosa.* The "White or Common Pine," often known simply as "Pine" or "Cypress Pine," but also as "Mallee Pine," "Rock Pine," etc. Well known under its name of "Murray Pine." It is the most widely diffused of all the Cypress Pines, being found in every one of the mainland colonies. It is easily known by its rather ornamental warted cones.

(4) *C. columellaris.* This is usually known as "Cypress Pine," and it attains a great size. It appears to be confined to the coast districts and moderate elevations of Northern New South Wales and Southern Queensland.

(5) *C. Muelleri.* "Baron Mueller's Cypress Pine," "Mountain Pine." This species is often very ornamental. Its range does not appear, at present, to be very well defined. I have collected it at Middle Harbor, Port Jackson, and in the Blue Mountains (Mount Victoria). It has been sent to me from the Illawarra. Mr. Baker has collected it at Rylstone in the Mudgee district.

(6) *C. cupressiformis.* Perhaps better known by its synonym of *rhomboidea.* This pine I believe to have been a good deal confused (in New South Wales) with the preceding. Of course, the cones are quite different. It is usually simply known as "Pine" or "Cypress Pine." It is extensively diffused in the coastal districts.

(7) *C. calcarata.* Better known under its synonym of *Frenela Endlicheri.* Everybody knows it under its name of "Red or Black Pine," whose timber is so largely used in the western parts of the Colony where white ants are prevalent. I need not further allude to the species here.

Of the above, *C. verrucosa* and *C. calcarata* will be found by far the most important from a commercial point of view, but the others all produce excellent Sandarach.

EXPERIMENTS ON SOME AUSTRALIAN SANDARACH OF VARYING QUALITY FROM VARIOUS SPECIES.

Having learned what sandarach is, and what Australian trees produce it, the following notes of observation and of incomplete experiments on definite Australian sandarachs will be interesting. To push the experiments further than I have done would be more of scientific than of economic interest.

My experiments tend to show this: Given similar circumstances in regard to size and age of tree, season of flow, climatic conditions, etc., the sandarachs from all the species are precisely similar in chemical and physical properties. Conversely it follows that if two specimens of sandarach are of different qualities, the explanation is to be found in the circumstances above enumerated. What is the best season to collect sandarach or to bleed trees in a particular district, is only to be learned by experience, and I think I have said enough to show that it is worth the trouble to try and find out.

Callitris verrucosa, R. Br. (Syn. *Frenela robusta*, A. Cunn). A sample of "Murray Pine" resin from Quiedong, near Bombala, has a pale bleached appearance, much lighter than ordinary sandarach. Externally it has a very mealy appearance. Water has no effect on it. In rectified spirit, it almost wholly dissolves, leaving a little whitish resinoid substance. Petroleum spirit dissolves 5 per cent. of a perfect colorless and transparent resin.

Speaking of "Mountain Cypress Pine," or "Desert Pine" (*C verrucosa*), the catalogue of Victorian Exhibits, Colonial and Indian

Exhibition, 1886, states: "A sandarach in larger tears than ordinary sandarach is yielded by this species. It yields it in considerable abundance, 8 or 10 ozs. being frequently found at the foot of a single tree, but although this exudes naturally, the supply is stimulated by incisions."

"It is a transparent, colorless or pale yellow body, fragrant and friable, fusing at a moderate temperature, and burning with a large smoky flame; very soluble in alcohol and the essential oils, and almost totally so in ether; turpentine at the ordinary temperature does not act upon it, nor do the drying oils, but it may be made to combine with these solvents by previous fusion." (*Report on Indigenous Vegetable Substances, Victorian Exhibition*, 1861.)

This resin was used to make firm the union (after lashing) of the hardwood head to the reed in the making of reed spears by the aborigines of Victoria. The resin was called by them Bij-jin-ne. (Brough Smyth, *Aborigines of Victoria*, i, 306.)

A sample of New South Wales resin of this species is of a dark amber color, and, externally, possesses the dulled appearance found on lumps of amber. It is the darkest specimen of an Australian Sandarach hitherto examined by me. It almost wholly dissolves in rectified spirit, yielding a bright yellow liquid, leaving 2·5 per cent. of insoluble residue. Petroleum spirit removes 22·8 per cent. of a clear resin when the original substance is digested in it.

Callitris verrucosa, R. Br. (Syn. *C. Preissii*, Miq. partly). The following note by Dr. Julius Morel (*Pharm. Journ.* [3], viii, 1025) in regard to a specimen of South Australian resin, is interesting: "With Sandarach resin may be connected another resinous substance, which was exhibited in the Paris Exhibition of 1867, from South Australia, under the name of "Pine Gum." It is the resin of *Callitris Preissii*, Miq. The product resembles Sandarach, and might become an important article of commerce. . . . This resinous substance occurs in the form of slightly yellowish tears, thicker and longer than those of ordinary Sandarach. In consequence of unequal contraction it presents, like Sandarach, numerous facets, and, consequently, the surface appears to be covered with a white powder. In its transparency and hardness the resin corresponds to Sandarach. Its odor is very agreeable and balsamic, and the taste is bitter and balsamic."

Callitris columellaris, F. v. M. (Syn. *Frencla robusta*, A. Cunn: var.

microcarpa, Benth.). A sample of resin from this species dissolves almost entirely in rectified spirit, forming a pale yellow solution. The insoluble residue amounts to 4·6 per cent Petroleum spirit, when digested on the resin, removes no less than 35·8 per cent. of a transparent, colorless resin. This is a remarkable percentage, and it would be interesting to inquire whether Australian Sandarach becomes increasingly soluble in that menstruum by age. An ordinary sample of commercial Sandarach yielded 8·9 per cent. to petroleum spirit:

Callitris cupressiformis, Vent.: "The Oyster Bay Pine of Tasmania," partly. This is the pine already referred to, and a brief account of the resin has been copied into many of the text-books. I have collected resin of this species from Port Jackson, clear and transparent as water. It turns pale amber-colored if placed in a bottle, but its brilliancy shows no sign of diminution in that time. The Sydney trees readily exude their resin on slightly wounding, and the same remarks apply to the Tasmanian.

Callitris calcarata, R. Br. (Syn. *Frenela Endlicheri*, Parlat). A sample of Red Pine resin from the Lachlan River has freshly exuded, and has the color and appearance of best selected Sandarach. Rectified spirit nearly wholly dissolves it, forming a beautifully clear, slightly yellowish liquid, with 1·3 per cent. of residue. Petroleum spirit extracts 22·1 per cent. of an apparently perfectly colorless and transparent resin.

APPENDIX A.

Gum Sandarach.

London, 11th May, 1892.—The market is very dull. At auction sale last Thursday a few packages sold, without reserve, at 59s. 6d. to 61s. for fair palish gum.

London, 16th September, 1893.—Sold cheaply to-day at a decline of about 3s. to 4s. for a parcel of 13 casks, offered without reserve; it brought from 72s. to 74s. per cwt.

London, 14th October, 1893.—A parcel of 12 casks sold cheaply, without reserve, at 65s. per cwt., one lot realizing 1s. more.

London, 25th November, 1893.—Nineteen casks sold very cheaply to day; ordinary dirty and dusty at 48s. 6d., medium quality at from 64s., rising to 69s. per cwt.

London, 3d March, 1894.—Seven casks, mostly oil damaged, sold, without reserve, with fair competition, at 41s. to 56s. per cwt.

The latest London quotation of a wholesale London firm is 125s. per cwt.

EDITORIAL.

THE AMERICAN PHARMACEUTICAL ASSOCIATION.

As stated on another page, the time of holding the next meeting of this Association, at Denver, Col., has been fixed for August 14th. It was first contemplated holding the meeting in June, and for some reasons this would have been satisfactory, but the latter month is one in which many State Pharmaceutical Associations are convened, and this would, no doubt, have been the cause of many members failing to reach Denver.

It was certainly demonstrated, in 1893, that August is a suitable month in which to hold the meeting of the National Association, and that it is by no means the most disagreeable month in which to travel.

PUBLIC MISUSE OF CARBOLIC ACID.

We have just received a circular, bearing the above title, from a committee of the Cleveland Pharmaceutical Association, which circular contains a valuable suggestion and considerable sound, practical sense.

The committee state that "carbolic acid, U. S. P., is in crystals; and not being convenient in this form for the household or medical use, it is made liquid by the addition of from 5 to 8 per cent. of water; when thus prepared, it does not strictly conform to the legal (U. S. P.) standard, yet by common usage it has become recognized by the public and by many physicians, erroneously, as true carbolic acid, and has been so labelled."

Since this conveniently liquefied acid apparently mixes with water, oils and other liquids, yet solution does not usually take place. The strong, milky or cloudy acid that remains undissolved acts as a powerful caustic instead of a healing agent.

"If directed to be mixed at home with oil, vaseline, lard or other fats, the liquefied acid will not dissolve on account of the 5 to 8 per cent. of water it contains, thereby resulting in caustic instead of healing actions."

"If swallowed by accident it is almost universally fatal before assistance can arrive; yet it is not desired or needed in so dangerous a liquid form."

"The Cleveland Pharmaceutical Association, having had its attention called thereto, and believing that it owes a duty to the public to prevent injury as far as possible without depriving the people of the proper use of a valuable drug, have devised and adopted a formula and label for carbolic acid for general dispensing purposes, which they hope will do away with much of the injury due to careless use, and respectfully request the co-operation of all pharmacists and physicians to that end.

FORMULA.

Take of carbolic acid crystals	16 troy ounces.
Glycerin	40 "

Melt the acid and stir in the glycerin.

OR FOR PRACTICAL PURPOSES.

Carbolic acid	1 measure.
Glycerin	2 measures.

"This formula furnishes a 33 per cent. carbolic acid fluid. The label explains the rest. It is to be popularized as No. 33 carbolic acid, which indirectly instructs the physician as to the strength of the acid and indirectly enables him to tell what strength it is by its directions for making a practically 1 per cent. solution; thus also, by multiplying the amount directed, he can order a 1, 3, 4 or 5 per cent. solution, as desired.

"This No. 33 acid mixes readily with water or alcohol in all proportions, and not being as caustic, cannot result in as much mischief or fatality if taken accidentally or purposely.

"The Cleveland Pharmaceutical Association have unanimously decided to recommend:

"(1) To all druggists, and especially to their members, not to dispense a stronger carbolic acid than No. 33, except on physicians' prescriptions.

"(2) To all physicians, when desiring to mix carbolic acid with fatty bodies, instead of entrusting such dangerous work to the laity (since such work requires professional skill to suit each case), it will be the best entrusted to the proper professional expert—the pharmacist.

"(3) To all physicians requiring the liquefied carbolic acid as hitherto dispensed, to please specify this article in their prescriptions to avoid error and relieve the druggist of the responsibility for dispensing it, or of embarrassment for refusing to sell without prescription.

"(4) All druggists desiring electrotypes of the label may obtain them by applying to the committee.

NATHAN ROSEWATER,
P. I. SPENZER, M D.,
E. A. SCHELLENTRAGER,
EUGENE R. SELZER,
T. L. SORDS,
Committee."

The label which accompanies the circular designates the solution as "Strong Carbolic Acid, Fluid. No. 33." The antidotes are given and also the directions for making a 1 per cent. solution by mixing one tablespoonful of the solution with one pint of water.

We can subscribe to all of this circular, except the first recommendation, which is that druggists shall not dispense a stronger carbolic acid than No. 33, except in physicians' prescriptions.

We cannot recommend that any prescription or compound be suddenly reduced to one-third strength and dispensed without any legal authority. This is the kind of reasoning employed by those who sell weak laudanum.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Pharmaceutical and Medical Chemistry. A Text-Book of Chemistry intended for the Use of Pharmaceutical and Medical Students. By Samuel P. Sadtler, Ph.D., F.C.S., and Henry Trimble, Ph.M. J. B. Lippincott Company. 1895.

This is a compendious text-book of several branches of chemistry, filling nearly one thousand large octavo pages. Its issue, in these generous proportions, is an event of interest, as it will take a prominent place among one-volume publications bearing the title of pharmaceutical chemistry. Its authors are severally well known for their respective publications, and their conjoined names have therefore a favorable introduction to students and practitioners of medicine and of pharmacy.

The work furnishes ninety pages upon elementary physics, four hundred and thirty pages upon inorganic chemistry, two hundred and seventy-nine pages upon organic chemistry, and in ninety-six pages gives certain data for chemical and pharmaceutical analysis. The style throughout is direct, clear and easy; the treatment of subjects is that of simple explanatory statement, with little discussion of theory, and altogether without citation of authorities.

The presentation of physics, in its first principles, as a distinct introductory part, is a very commendable feature for such a general text-book as this is designed to be, because those students who have most used such general text-books have commonly neglected the use of any separate text-book of physics

for collateral reading. In Part I of this work the general and special properties of matter, and the laws of heat, light and electricity are outlined in brief. Such subjects as the use of the balance, the determinations of density, the principles of the microscope, spectroscope and polariscope are introduced, the limits of space not covering topics like the use of the refractometer, the modern studies of solution, etc. In a general treatise upon chemistry, the primary conceptions of physics are necessary to a clear understanding of the nature of chemical action, and the one study ought to be a companion to the other.

In Part II, devoted to the chemistry of the non-metals, directions are given for very simple practical exercises, that is to say, easy experiments, showing the character of the elements and the manner of chemical reaction. In this part, as well as in Part III, treating of the metals, the operations of industrial chemistry receive a good share of attention. Throughout these two inorganic divisions of the book, and also in the division of organic chemistry, the articles of the U. S. Pharmacopœia are announced in full type, and are described from the Pharmacopœia, as they are reached in the chemical order of the work.

The text for organic chemistry, in Part IV, is by necessity of space less ample in proportion to the extent of the subject, but the treatment is especially concise, and in quite full accord with the present state of organic research in its last results. For all simple and typical compounds the molecular structure is fully stated, and for representative types certain of the most important proofs of structure are given. The synthetic products used in medicine are described, both as to constitution and chemical properties. Certain of the more important series of organic compounds are tabulated with their physical constants. The carbohydrates are presented in the classification which has been adopted, following the work of Emil Fischer.

But statements of stereochemical isomerism seem to be avoided, except in a paragraph of the introduction. The subject of essential oils, camphors and resins is made rich in recent chemistry, and the text upon the alkaloids is very much more systematic and full than in most treatises upon organic chemistry, as, indeed, it might well be. The alkaloids have been huddled into closing pages of current chemical text-books as though they were a supernumerary residue of things merely dissected out of plants; and this for years after the results of Hofmann and Ladenburg, O. Hesse and E. Schmidt, Claus and Liebermann, among many, have been on record in literature as classic as any in the science. Finally, the manufacturing operations related to organic chemistry, the industries of fermentation, dry distillation, etc., are liberally presented in a way that is already familiar to the readers of the volume on industrial chemistry issued by one of the authors of this work a few years ago.

The compact analytical data in Part V include brief directions and tabulated schemes for qualitative work, selections for gravimetric and volumetric use, the latter with certain assay processes from the pharmacopœias. The work is in excellent print, upon the best of paper. The authors may be congratulated upon it.

A. B. PRESCOTT.

A STANDARD DICTIONARY OF THE ENGLISH LANGUAGE, VOLUME II. I. K. Funk, D.D., Editor-in-chief; F. A. March, LL.D., Consulting Editor; D. S. Gregory, D.D., Managing Editor; and the following Associate Editors: John Dennison Champlin, M.A.; Rossiter Johnson, Ph.D.; Arthur E. Bostwick, Ph.D. New York, Toronto and London. Funk & Wagnalls Company. 1895.

It has been just about a year since the first volume of this truly magnificent work was reviewed in this journal.

Two hundred and forty-seven editors, selected from the front ranks of English and American scholars, have been engaged upon this book.

About five years have elapsed since this work was undertaken, and $960,000 were expended before a copy was offered for sale.

To give some idea of the advances made in the language in modern times, we may quote the following comparisons: *Johnson's Dictionary* contains 45,000 vocabulary terms: *Worcester's*, 105,000; *Webster's International*, 125,000; *Century* (six volumes), 225,000; *Standard*, 301,865, exclusive of the appendix, which contains 47,468 entries.

One of the attractive features of the work is the magnificent colored plates. That of the solar spectrum and typical colors is especially noteworthy.

Some of the titles are defined so as to be encyclopædic in character. As an illustration, we may mention the term *oils*, under which are given the name, source, use and properties of 337 different oils.

About four pages are devoted to the term *measure;* and *weight* receives a similar exhaustive treatment. Different systems under both of these titles are compared so as to be especially instructive.

The title, *pharmacy*, is defined as "the branch of materia medica that treats of the compounding of drugs and other substances for use in medicine, including also their collection, preservation and identification; the art or business of compounding and dispensing medicines." Those of us who claim that pharmacy is a profession cannot extract much consolation from such a definition.

Medicine comes off a little better as "the healing art; the science of the preservation of health and of treating disease for the purpose of cure." We can hardly agree, however, with the following statement: "Plants and minerals are the source of most medicines." Since the introduction of serum therapy and the flesh extracts, it is necessary to exercise caution in making sweeping statements, besides it is stretching a point to assign the origin of many of the new synthetic remedies to either plants or minerals; the source is too remote.

We have no wish, however, to find fault with what is undoubtedly the greatest dictionary of modern times. Its two volumes stand in strange contrast with the ponderous six-volume *Century Dictionary*, which does not contain as much information.

The reception given to the *Standard Dictionary* has been so universal and so enthusiastic that we feel sure it will become *the* standard for America, if not for all English-speaking countries.

The following prices will be of interest to many:

SOLD ONLY BY SUBSCRIPTION.

Single-volume Edition.	Price.
Half Russia	$12 00
Full Russia	14 00
Full morocco (With Denison's patent reference index)	18 00
Two-volume Edition.	
Half Russia	$15 00
Full Russia	17 00
Full morocco (With Denison's patent reference index)	22 00

MANUAL OF CHEMISTRY. By W. Simon, Ph.D., M.D. Fifth edition. Philadelphia, Lea Bros. & Co. 1895.

The demand for this work has necessitated the issue of another edition, and the author has taken the opportunity to thoroughly revise it and bring it in complete harmony with the new Pharmacopœia. The orthography recommended by the American Association for the Advancement of Science has not been fully adopted, for the reason that neither the leading chemical journals nor the United States Pharmacopœia use this spelling, and that it would be unwise to have the student confronted with two different systems of orthography. The foregoing statements of the author we can heartily endorse; the student should not be confronted with any more systems in anything than are absolutely necessary, least of all in the every-day matter of spelling. Let the Pharmacopœia lead.

What has been said of Dr. Simon's standard work in previous pages of this journal, we can fully subscribe to, and we can especially commend the unique colored plates, representing, as they do, sixty-four chemical reactions. One new plate has been added to the present edition, showing the chemical behavior of a number of the more important benzene derivatives.

SWEET CASSAVA: Its Culture, Properties and Uses. By Harvey W. Wiley. Bulletin No. 44, U. S. Department of Agriculture, Division of Chemistry.

An abstract of this interesting and valuable contribution will be given in a future number.

ETIDORHPA, OR THE END OF THE EARTH. The Strange History of a Mysterious Being, and the Account of a Remarkable Journey, as Communicated in Manuscript to Llewellyn Drury, who promised to print the same, but finally evaded the responsibility, which was assumed by John Uri Lloyd. With many illustrations by J. Augustus Knapp. Author's edition, limited. Cincinnati, John Uri Lloyd. 1895.

We have been allowed to see some proof-sheets of a work which is destined to figure conspicuously in the literature of both science and romance.

Professor Lloyd is well and favorably known as an experimenter and a writer on scientific subjects relating to pharmacy, but it will surprise some of his friends to know that he now appears in the rôle of philosopher and romancer. If it is feared by any one that the author, in assuming such a difficult part, has impaired his faculties for writing on pharmaceutical subjects, we venture to convince them of the contrary by pointing to his valuable paper on distilled water, which appears on p. 190, of this number of the JOURNAL, and which was prepared by him since his "Etidorhpa" went to press.

As we have not the whole work we reserve our decision, but feel safe in saying that it will be intensely interesting and at the same time instructive.

The following interesting contributions have been issued by the Department of Agriculture of New South Wales, and forwarded by the author, Mr. J. H. Maiden, of the Technological Museum at Sydney:

USEFUL AUSTRALIAN PLANTS. No. 12—THE TURPENTINE-TREE. (*Syncarpia laurifolia*, Ten.). No. 14—THE NEW SOUTH WALES BLUE GUM. (*Eucalyptus saligna*, Sm.).

GRASS TREE GUM. TAN SUBSTANCES (Canaigre).

THE CORKWOOD OR DUBOISIA. AUSTRALIAN SANDARACH (we reprint this last on page 214).

ÉTUDE DE NOUVELLES PLANTES MÉDICINALES NÉOCALÉDONIENNES. (*A*) *Résine de Gardenia.*—(*B*) *Gomme-résine de Garcinia.*—(*C*) *Produits des Spermolepis* (*Chêne-gomme*). Par MM. Édouard Heckel et Fr. Schlagdenhauffen.

The last one of these secretions is of especial interest on account of its richness in gallotannic acid. The following is given by the authors as its composition:

	Per Cent.
Gallotannic acid	79·73
Tanno-resin	19·50
Gum, coloring, albuminoids, salts	0·47
Crystalline substance	0·30
	100·00

The following interesting contributions have been received from the author, Professor Dr. A. Tschirch:

(1) F. A. FLÜCKIGER, Sonderabdruck aus den *Berichten der Pharmaceutischen Gesellschaft.*

(2) DIE KEIMUNGSGESCHICHTE VON MYRISTICA FRAGRANS, HOUT. *Sonderabdruck aus den Bericht. d. Phar. Gesell.*

(3) UNTERSUCHUNGEN UEBER DIE SECRETE. (10) UEBER DEN TOLUBALSAM. Von Paul Oberländer. *Sonderabdruck aus den Archiv der Pharmacie.*

(4) UEBER SECRETE UND SECRETBILDUNG. *Separatabdruck aus Pharm. Post.*

ANTISEPSIS AND ANTISEPTICS. By Charles Milton Buchanan, M.D. With an Introduction by Prof. Augustus C. Bernays. The Terhune Company, Newark, N. J. 1895.

The 350 pages of this book treat of a very interesting subject in such a manner that it is not apparent at first sight that a part of it is a thinly-disguised advertisement of a certain antiseptic preparation manufactured by a St. Louis "chemical company." No doubt "up-to date" prescribers are already ordering it, and the long-suffering pharmacist is already "stocking" with it, although under protest. "Sennine" is its name; it is a combination of phenol and boric acid, of such rare properties that it contains all the virtues of these two valuable agents, without any of their disadvantages. The formula by which this peculiar compound is obtained is not given.

THE ALKALOIDS, ALKALOIDAL SALTS, AND NEUTRAL PRINCIPLES OF THE UNITED STATES PHARMACOPŒIA. Compiled by Albert N. Doerschuk, Ph.G.

This is in chart form, and was originally issued as a supplement to the *National Druggist*, and copies may be obtained free by writing to that journal at St. Louis, Mo.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

THE AMERICAN PHARMACEUTICAL ASSOCIATION.

WASHINGTON, D. C., March 18, 1895.

The Council has, by vote, named Wednesday, August 14, 1895, for the next meeting of the American Pharmaceutical Association, which is to be held in the city of Denver.

The arrangements for hotel accommodations and transportation have not yet been effected. As soon as completed they will be announced.

W. S. THOMPSON,
Chairman of the Council, American Pharmaceutical Association.

The best reason that can be given for becoming a member of the American Pharmaceutical Association is *because it pays.*

There is no initiation fee. The annual dues are $5, payable after the election of a member, or, preferably, when application is made. There is no other expense connected with becoming and continuing a member than this $5 per annum.

The American Pharmaceutical Association was founded forty-three years ago, the first meeting being held in the city of Philadelphia, on October 6, 1852.

Its aim was to unite the educated and reputable pharmacists and druggists of America in securing such objects as would elevate pharmacy. By united action, it has fully justified the designs of its founders; its roll contains the names of over 1,700 members, drawn from all parts of North America, some of the most distinguished exponents of the art and science having been enrolled.

Its objects appeal to no clique, section or faction, but it is, in the broadest sense, a national body. It has from the first encouraged and fostered State Pharmaceutical Associations, receiving delegates from these bodies, and extending to them aid whenever such was sought.

Among the many benefits received in return for annual dues, the first to be mentioned is the handsomely-bound volume of about 1,000 pages, issued annually gratis to members. It is called "The Proceedings," yet this term but remotely expresses the character and value of the work. True, it contains the proceedings of the annual meeting, which are of much interest to members, but it contains what is of greater value—the interesting discussions and extemporaneous remarks, as they drop from the lips of America's most eminent pharmacists and authors, besides all papers read during the meeting, embracing every class of subjects with which the pharmacist is concerned.

Of great practical value to every retail pharmacist is the "Report on Progress of Pharmacy," which is published in the volume of proceedings. This feature alone will give as great returns as can be derived from $5 invested in works of reference. The formulæ are well worth the price.

With the continued growth of pharmacy in this country it has become of the utmost importance for all organized bodies to work in harmony, and it is earnestly hoped that the members of State Associations will strengthen the parent body and in turn receive the benefits which this powerful organization can bestow, by becoming members of the National Association. This may be done by filling out an application which can be obtained from Dr. H. M. Whelpley, 2342 Albion Place, St. Louis, Mo., Chairman of the Committee on Membership. Return the application with $5 to Mr. Geo. W. Kennedy, Pottsville, Pa., Secretary of the Committee. The 1895 meeting will be held in that world-renowned health resort, prosperous city and hospitable convention place, Denver, Col., August 14th to 21st.

AMERICAN PHARMACEUTICAL ASSOCIATION.
ORGANIZED 1852. INCORPORATED 1888.
SECTION ON PHARMACEUTICAL EDUCATION AND LEGISLATION.
The Forty-third Annual Meeting.

DENVER, COL., August 14, 1895.

The Committee on Education and Legislation desires to present statistical information on these two important branches this year.

In order that the educational and legal status of pharmacy may be improved, it is deemed essential that the present requirements, as existing in over forty States, be summarized for ready reference and comparison. Secretaries of Pharmacy Boards, Colleges and other members are respectfully requested to transmit the information required for the subjoined queries at the earliest date for tabulation by the Secretary.

Papers on subjects considered by this section are urgently solicited and should be in hand, together with an abstract or synopsis, NOT LATER THAN JUNE 15th, that they may be printed for distribution at the meeting.

Kindly advise the Secretary of this Section as promptly as possible what contribution you intend to make.

Fraternally,

JAMES M. GOOD, *Chairman*,
2348 Olive Street, St. Louis, Mo.
JAMES H. BEAL, *Associate*,
Scio, O.
CARL S. N. HALLBERG, *Secretary*,
358 Dearborn Street, Chicago, Ill.

Chicago, Ill., March 1, 1895.

THE PITTSBURG COLLEGE OF PHARMACY.

The subscribers to the fund for the new Pittsburg College of Pharmacy building met on Thursday, February 21st, in the Chamber of Commerce rooms, for the purpose of forming a permanent organization.

The officers elected were: Wm. G. Schirmer, President; Theodore E. Ihrig, Recording Secretary; Joseph P. Urben, Treasurer; and S. S. Holland, Louis Emanuel and A. J. Kaercher, Vice-Presidents.

Prof. F. T. Aschman, Louis Emanuel and E. A. Schaefer were appointed a committee to draw up a constitution and by-laws.

One of the objects of the organization is to form a Druggists' Club for the furtherance of social and trade interests. It is hoped that all the druggists in the county will become members of the club, which will own and control the proposed new College building, which will contain the rooms of the Association also. By thus forming a club with a financial standing it is hoped that much can be accomplished in the way of relieving the present evils of the trade.

The following committee was appointed to solicit membership: John C. Smith and Richard Mierzwa, Lawrenceville; George L. Bimber, South Side; T. Ray Wirsing, Sharpsburg; C. E. Steunz, Mt. Washington; B. P. Welsch, Charles F. Walther and J. F. Neely, Allegheny; D. B. Kahle, New Kensington; C. A. Givens, McKee's Rocks; Otto Friebing, East End; A. F. Judd, Beaver Valley; W. C. Martin, Homestead; Howard Jackson, Wilkinsburg; Adolph Schmidt, McKeesport; Joseph M. Dodds, Braddock.

STATE BOARD OF PHARMACY, ILLINOIS.

At a meeting of the State Board of Pharmacy, Illinois, held February 12, 13, 14, 15, 19, 20, 21, 1895, for examination, 141 applicants were present, out of which 34 passed the examination for registered pharmacists.

The next meeting of the Board will be held in Chicago, April 16, 1895, at 173 Thirty-ninth Street. All applications must be on file in the office at Springfield on or before April 13, 1895. Applications will not be received the day of the meeting. Address all communications to Springfield.

FRANK FLEURY, *Secretary*,
Springfield, Illinois.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, March 19, 1895.

On motion of Professor Trimble, Wm. McIntyre was asked to preside.

The Registrar presented, on behalf of the publishers, through the JOURNAL OF PHARMACY, to the library a copy of the Standard Dictionary of the English Language, volume II, published by Funk & Wagnalls, and a copy of Sadtler & Trimble's completed text-book of Medical and Pharmaceutical Chemistry. They were received with the thanks of the College.

A paper was read by Mr. C. H. La Wall on the *Chlorinated Compounds of the United States Pharmacopœia.* After reading, a discussion which followed showed that the chlorinated lime, which is one of the most used chlorinated compounds, deteriorates faster by moisture than by any other cause, and that heat, if it be not above 70° F., exerts but little deleterious influence upon it. The general opinion was that *liquor sodæ chloratæ* was better made by the formula of 1880 Pharmacopœia than by that of 1890.

Mr. W. E. Ridenour read a very interesting paper upon the *Chemical Characteristics of the Various Kinds of Cacao Beans of Commerce.* The paper was the occasion of a number of queries relative to the best cocoa for soda water and dietetic uses, and whether the chemicals used by some changes the character of the cocoa.

The flavor of cocoa of the Caracas is generally more highly esteemed than other varieties. The Dutch prepared chocolate has a larger percentage of ash.

The question was asked whether the Kola nut is used to any extent for fabrication of chocolates.

The papers were referred to the publication committee.

Professor Trimble inquired whether there was any demand for Loeffler's Toluol Solution for diphtheria. The reply was that the druggist should make it and let doctors know they had it.

Mr. Kebler asked if any members present had experienced unpleasant effects on their eyes from handling and examining saffron. The inquiry was made as to the variety of saffron handled, as there are so many substances and adulterations in saffron. Mr. Beringer said that the ash of saffron retained the shape of plant unchanged. Mr. Kebler also asked what should be sold as *black sulphur.* That commonly sold is black sulphide of antimony and flowers of sulphur. Another article examined proved to be metallic iron, crude sulphur and earthy matters; another carbonate of calcium and coal dust. Sulphur

vivum, the residue from sublimation of sulphur, reduced to powder, is also known under this name.

It was suggested that Mr. Kebler furnish the next meeting with a paper upon this subject.

White sulphur was also inquired about. This is usually precipitated sulphur made by precipitating sulphur with sulphuric acid instead of hydrochloric acid, thus contaminating it with sulphate of calcium.

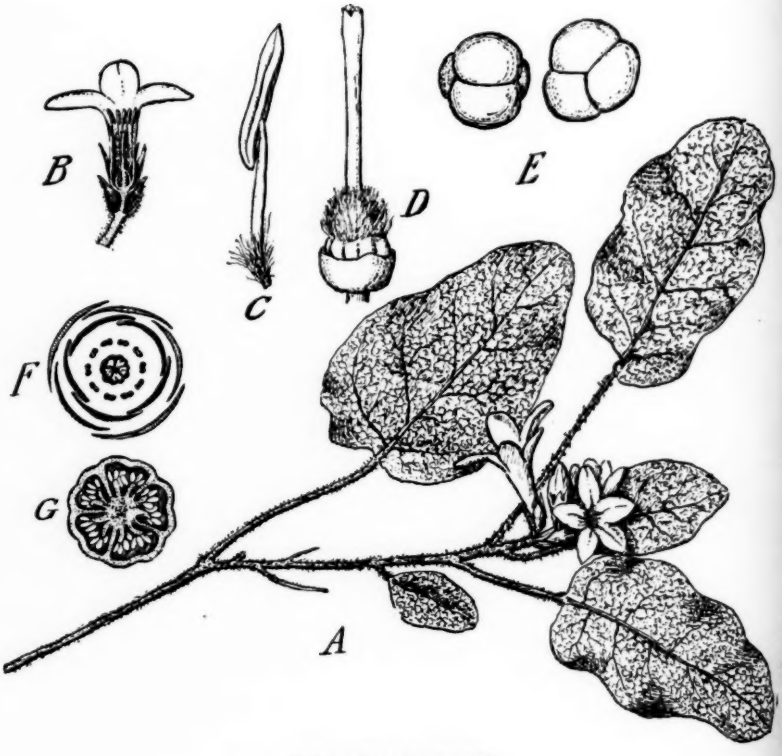
Adjourned. T. S. WIEGAND, *Registrar.*

OBITUARY.

CHAS. BRADFORD HUNTERSON, PH.G.

Chas. Bradford Hunterson, Ph.G., Class of 1881, was born in Philadelphia, Pa., October 12, 1860, and died at his residence, 1828 Frankford Avenue, Philadelphia, Pa., December 9, 1894, in his 35th year, of pleura pneumonia. He received his early education in the public schools of Philadelphia, and went to Pottsville, where he spent four years and finished his education, after which he returned to Philadelphia and entered the employ of Dr. Clement B. Lowe, Ph.G., corner Ninth and Vine Streets, and remained about one year, after which he went with Wm. Wilson, Montgomery Avenue and Thompson Streets, with whom he remained until he finished the drug business. While with the latter he attended the Philadelphia College of Pharmacy with the class of 1881. After his graduation he entered the employ of Lancaster Thomas, corner Nineteenth and Pine Streets. In 1886, he purchased the drug store, 1828 Frankford Avenue, corner Vienna Street, which he occupied up to the time of his death. In 1891, he was elected a member of the Executive Board of the Alumni Association, and continued a member up to the time of his decease. He was an active member of the Northeast Branch of the Young Men's Christian Association, and took a great interest in the erection of their new building, assisting in the collecting of the funds for that purpose, and was elected its Treasurer, which position he held up to the time of his death. He was also an active member and one of the Trustees of the Bethesda Presbyterian Church. He was married in 1888 to Miss Porter, daughter of the Hon. Jas. Porter, of Camden, N. J., who survives him, with two children. A sad feature of his death was the loss of a younger brother just two weeks previous, with the same disease.

W. E. K.



EPIGÆA REPENS.